

## CLAIMS

*What Is Claimed Is:*

1. A method of performing a virtual network connection  
5 merge, the method comprising:

assembling at least one data unit from data traffic of at  
least one network connection;

calculating a credit for each network connection;

determining a chosen data unit to be transmitted to an  
10 output channel, wherein the step of determining the  
chosen data unit depends on credit of the network  
connections; and

transmitting the chosen data unit to the output channel.

- 15 2. The method of Claim 1, wherein the step of assembling at  
least one data unit comprises:

allocating the data traffic of the at least one data unit  
into memory cells;

adding the memory cells to cell descriptor (CD) lists  
20 until an end of frame (EOF) cell is received,  
wherein the end of frame cell is used to identify  
unit boundaries.

- 25 3. The method of Claim 1, wherein the calculating step  
comprises calculating a higher credit for a network

connection having a data unit that is ready for transmission, wherein a ready data unit is a whole data unit with memory cells filled with data traffic.

- 5 4. The method of Claim 2, wherein the step of transmitting the chosen data unit comprises:

allocating merge bandwidth for the chosen data unit;

adding memory cells of the chosen data unit to transmit lists; and

10 transmitting the memory cells of the chosen data unit to the output channel based on information in the transmit lists, wherein the memory cells of the chosen data unit are transmitted until an end of frame cell of the chosen data unit is transmitted.

- 15 5. The method of Claim 1, further comprising:

determining another chosen data unit to be transmitted to the output channel; and

20 transmitting the other chosen data unit to the output channel.

6. The method of Claim 5, further comprising performing steps of the method until all data units with sufficient credit have been transmitted.

7. The method of Claim 1, wherein the at least one network connection includes Asynchronous Transfer Mode (ATM) connections.

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8. The method of Claim 1, further comprising:

assigning a bandwidth guarantee to each network connection;

receiving an overload of traffic from a network connection having a relatively low bandwidth guarantee; and

storing the overload of traffic into at least one stored data unit.

9. The method of Claim 1, wherein the calculating step comprises:

assigning a relative frequency value to each network connection, wherein a higher relative frequency value is assigned to a network connection requiring a higher relative bandwidth; and

allocating credits to each network connection in proportion to relative frequency values of ready network connections of a same virtual network connection merge.

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10. The method of Claim 9, wherein the determining step comprises:

generating a particular bandwidth shape token for the virtual network connection merge; and

5 receiving a bandwidth shape token configured to assist in identifying the chosen data unit.

11. An integrated circuit configured to perform a virtual network connection merge, the integrated circuit comprising:

controller circuitry configured to control operations of:

assembling at least one data unit from data traffic of at least one network connection;

calculating a credit for each network connection;

15 determining a chosen data unit to be transmitted to an output channel, wherein the step of determining the chosen data unit depends on credit of the network connections; and

transmitting the chosen data unit to the output channel.

12. The integrated circuit of Claim 11, wherein the controller circuitry is further configured to control operations of:

allocating the data traffic of the at least one data unit  
into memory cells;

adding the memory cells to cell descriptor (CD) lists  
until an end of frame (EOF) cell is received,  
5 wherein the end of frame cell is used to identify  
unit boundaries.

13. The integrated circuit of Claim 11, wherein the  
controller circuitry is further configured to control an  
operation calculating a higher credit for a network  
connection having a data unit that is ready for  
transmission, wherein a ready data unit is a whole data  
unit with memory cells filled with data traffic.

14. The integrated circuit of Claim 12, wherein the  
controller circuitry is further configured to control  
operations of:

allocating merge bandwidth for the chosen data unit;

adding memory cells of the chosen data unit to transmit  
20 lists; and

transmitting the memory cells of the chosen data unit to  
the output channel based on information in the  
transmit lists, wherein the memory cells of the  
chosen data unit are transmitted until an end of  
25 frame cell of the chosen data unit is transmitted.

15. The integrated circuit of Claim 11, wherein the controller circuitry is further configured to control operations of:

5 determining another chosen data unit to be transmitted to the output channel; and transmitting the other chosen data unit to the output channel.

10 16. The integrated circuit of Claim 15, wherein the controller circuitry is further configured to carry out operations of the integrated circuit until all data units with sufficient credit have been transmitted.

15 17. The integrated circuit of Claim 11, wherein the at least one network connection includes at least one Asynchronous Transfer Mode (ATM) connection.

20 18. The integrated circuit of Claim 11, wherein the controller circuitry is further configured to control operations of:

assigning a bandwidth guarantee to each network connection;

receiving an overload of traffic from a network  
connection having a relatively low bandwidth  
guarantee; and

storing the overload of traffic into at least one stored  
data unit.

19. The integrated circuit of Claim 11, wherein the  
controller circuitry is further configured to control  
operations of:

assigning a relative frequency value to each network  
connection, wherein a higher relative frequency  
value is assigned to a network connection requiring  
a higher relative bandwidth; and

allocating credits to each network connection in  
proportion to relative frequency values of ready  
network connections of a same virtual network  
connection merge.

20. The integrated circuit of Claim 19, wherein the  
controlling circuitry is further configured to control  
operations of:

generating a particular bandwidth shape token for the  
virtual network connection merge; and

receiving a bandwidth shape token configured to assist in  
identifying the chosen data unit.

21. A computer-readable medium carrying one or more sequences of one or more instructions for performing a virtual network connection merge, the one or more sequences of one or more instructions including instructions which, when executed by one or more processors, cause the one or more processors to perform the steps of:

assembling at least one data unit from data traffic of at least one network connection;

calculating a credit for each network connection;

determining a chosen data unit to be transmitted to an output channel, wherein the step of determining the chosen data unit depends on credit of the network connections; and

transmitting the chosen data unit to the output channel.

22. The computer-readable medium of Claim 21, wherein the step of assembling at least one data unit further causes the processor to carry out the steps of:

allocating the data traffic of the at least one data unit into memory cells;

adding the memory cells to cell descriptor (CD) lists until an end of frame (EOF) cell is received, wherein the end of frame cell is used to identify unit boundaries.



23. The computer-readable medium of Claim 21, wherein the calculating step further causes the processor to carry out the step of calculating a higher credit for a network connection having a data unit that is ready for transmission, wherein a ready data unit is a whole data unit with memory cells filled with data traffic.

24. The computer-readable medium of Claim 22, wherein the step of transmitting the chosen data unit further causes the processor to carry out the steps of:

allocating merge bandwidth for the chosen data unit;

adding memory cells of the chosen data unit to transmit lists; and

transmitting the memory cells of the chosen data unit to the output channel based on information in the transmit lists, wherein the memory cells of the chosen data unit are transmitted until an end of frame cell of the chosen data unit is transmitted.

25. The computer-readable medium of Claim 21, wherein the instructions further cause the processor to carry out the steps of:

determining another chosen data unit to be transmitted to the output channel; and

transmitting the other chosen data unit to the output  
channel.

26. The computer-readable of Claim 25, wherein the  
instructions further cause the processor to perform the  
steps until all data units with sufficient credit have  
been transmitted.

27. The computer-readable medium of Claim 21, wherein the at  
least one network connection includes Asynchronous  
Transfer Mode (ATM) connections.

28. The computer-readable medium of Claim 21, wherein the  
instructions further cause the processor to carry out the  
steps of:

assigning a bandwidth guarantee to each network  
connection;

receiving an overload of traffic from a network  
connection having a relatively low bandwidth  
guarantee; and

storing the overload of traffic into at least one stored  
data unit.

29. The computer-readable of Claim 21, wherein the calculating step further causes the processor to carry out the steps of:

5 assigning a relative frequency value to each network connection, wherein a higher relative frequency value is assigned to a network connection requiring a higher relative bandwidth; and

10 allocating credits to each network connection in proportion to relative frequency values of ready network connections of a same virtual network connection merge.

30. The computer-readable of Claim 29, wherein the determining step further causes the processor to carry out the steps of:

15 generating a particular bandwidth shape token for the virtual network connection merge; and

receiving a bandwidth shape token configured to assist in identifying the chosen data unit.